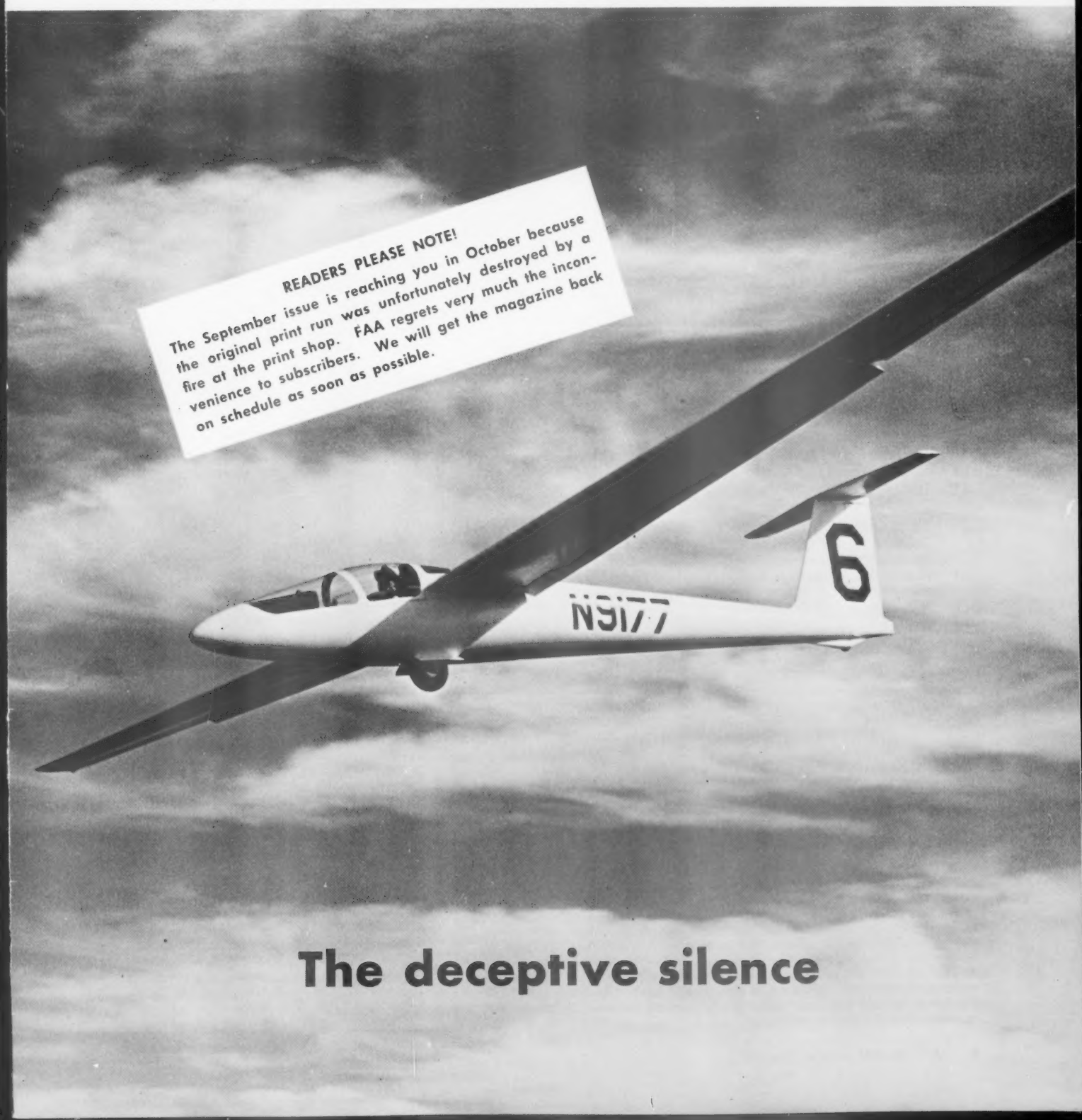
FAA GENERAL AVIATION NEWS

SEPTEMBER 1976

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN


READERS PLEASE NOTE!
The September issue is reaching you in October because the original print run was unfortunately destroyed by a fire at the print shop. FAA regrets very much the inconvenience to subscribers. We will get the magazine back on schedule as soon as possible.
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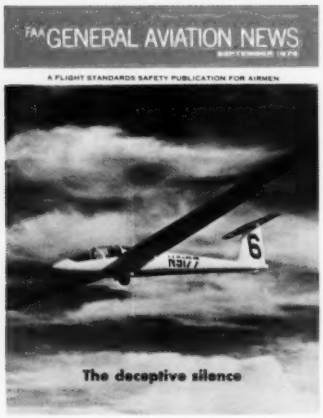
The deceptive silence



COVER:

Soaring in the California skies above the Mojave.

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 15, NO. 5

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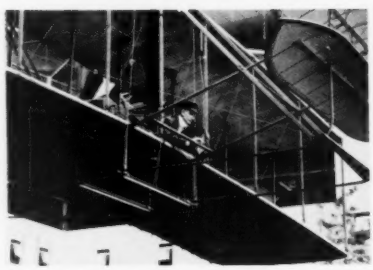

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Thunderstorm Turbulence

Weatherwise, September is usually thought of as a hurricane month, with the Gulf and Atlantic coastal areas most likely to be affected and fairly good flying weather anticipated for the remainder of the country. However, there are several interior areas, notably central Arizona and the mid-Mississippi Valley, where the number of thunderstorm days during the Fall quarter of the year averages between 10 and 20. And Autumn thunderstorms can be just as deadly to small-plane flying as summer thunderstorms.

The fact that one of the most prevalent causes of fatal accidents is a decision to penetrate adverse weather conditions beyond the capability of the pilot or aircraft is well known. Somewhat lesser known is the role of turbulence generated by thunderstorms. In 1975 there were 32 accidents listed by the National Transportation Safety Board in which turbulence associated with thunderstorms was given as the primary cause or a factor: 21 of these accidents were fatal. The odds are clearly stacked against surviving such an accident.

Although all thunderstorms begin with cumulous clouds, not all cumulous clouds form thunderstorms. How does the IFR pilot know when he can safely penetrate a cumulous cloud?

The location of storms can be mapped fairly accurately by the radar equipment of the Weather Service, and reports on storm activity are made available to pilots through FAA's Air Traffic Service. However, weather is seldom stationary, and storm cells may form and dissipate and reform quite rapidly under some circumstances. FAA radar may also be used to provide weather information, but pilots must realize that air traffic service radar is used in a mode which eliminates a large portion of the weather echoes in order to clearly delineate aircraft targets. FAA will not knowingly direct an aircraft into a storm cloud, but on the other hand the pilot should not assume that an assigned altitude or a given vector will keep him free of thunderstorm activity. Avoiding weather or turbulence is always the pilot's responsibility, even when IFR. If he does not have airborne radar, or some other electronic storm detection equipment, and he has reason to suspect that thunderstorms are breeding in the area ahead, his best course is to request a 180 degree turn. The fact that he cannot see a firm outline of a typical thunderstorm cloud is not evidence that none are in the area; thunderstorms often form within clouds and become active without visible warning. A grim illustration of how fast and deadly the action of a severe thunderstorm can be is provided by a fatal accident which took place in October of 1975, in the vicinity of central Illinois. According to NTSB files, the pilot in this case was a 49 year old insurance agent from Long Island who was on a vacation trip with his wife. He had a total of 260 hours, and about a month before the vacation he had obtained his instrument rating. By the time of the flight he had accumulated 11 hours of actual instrument time.

The couple rented a Beech *Bonanza* for the trip, and in the middle of October flew it out to Colorado Springs, Col. for their holiday. On the 24th of October they departed Colorado Springs for the return trip home, leaving at 10:30 in the morning. By the middle of the afternoon they had arrived at Kansas City, Mo. where they stopped for refueling and refreshments.

On the ground, the pilot checked with the Kansas City Flight Service Station for a route to Indianapolis. He received the en route weather forecast, which was not particularly good; it called for "significant clouds and weather with numerous thunderstorms and moderate rain showers." An AIRMET had also been issued at 11:10 that morning. valid until 5:00 P.M., and it was presented to the pilot. It read:

AIRMET Bravo 3. Flight Precautions. Over southeast half Missouri, extreme southeast Iowa, southeast two thirds Wisconsin, Lake Michigan, lower Michigan, Indiana, Illinois, west half Kentucky for winds excess of 30 knots within 2,000 feet of surface and occasional moderate turbulence below 8,000 feet.

Often thunderstorm tops build up to 25-35,000 feet, which is beyond the ceiling of most light aircraft. Turbulence may be encountered several thousand feet above the clouds.

Winds and turbulence diminishing slowly from west. Continue advisory beyond 1700.

The pilot, with his new instrument rating, filed an IFR flight plan for Indianapolis, and departed in the *Bonanza* at 4:20 in the afternoon. At 4:58 he reported that he was level at 11,000 feet, and he was cleared by the center to turn left to a heading of 075 to intercept Victor Airway 116 and then continue on course.

The *Bonanza* flew across the state of Missouri at that altitude, and as he neared the Illinois border at 5:10 he requested permission to leave the frequency so he could contact the FSS ahead at Quincy, Illinois.

The Air Traffic Control Specialist in the Quincy FSS, just inside the Illinois border, received the call from the *Bonanza*, which requested the weather for Springfield, some 100 miles ahead, and the weather for Indianapolis. The FSS specialist gave him those readings, telling him that the 5:00 P.M. weather reported for Springfield was an estimated 8,000 broken, 30,000 overcast, visibility 10, temperature 70, dewpoint 64, wind 170 degrees at 7, altimeter 29.85, cumulonimbus southeast.

He also gave the pilot an updated AIRMET, issued at 4:25, and valid until 11:00 P.M., which read:

AIRMET Bravo 4. Flight precautions over east Lake Superior, east upper Michigan, Lake Michigan, Lake Huron, Michigan, east Wisconsin, Illinois, southeast half Missouri, Kentucky and Indiana for low level winds and turbulence. Winds at or above 30 knots within 2,000 feet of the surface and occasional moderate turbulence below 8,000. Continue advisory beyond 2300.

In addition, the FSS gave him a SIGMET, issued at 4:45, and valid until 9:00 P.M., which read:

SIGMET Foxtrot 4. Flight Precaution. Over southeast half Missouri, east third Iowa, Illinois, east Wisconsin, upper Michigan, east Lake Superior, Lake Michigan, and west lower Michigan for thunderstorms. Thunderstorms occasionally forming broken to solid lines. Tops to above 40,000. Thunderstorms moving to the northeast at about 35 knots.

The pilot in the *Bonanza* had reported no difficulty thus far, although flying frequently in clouds. Asked if he wished to have a radar summary for his route, he replied in the affirmative. Quincy FSS then contacted the Kansas City Airway weather forecaster and was advised of thunderstorms of decreasing intensity in a north/south line east of Quincy. A break in the thunderstorms was observed in the area of Hanna City, Ill.

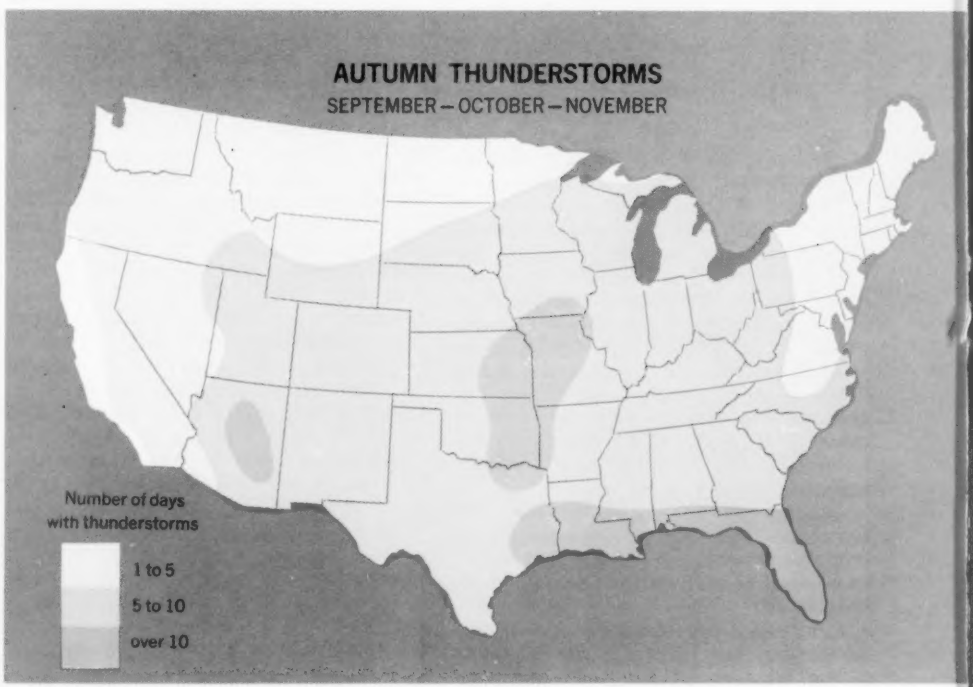
Before the FSS specialist could relay any of this information to the *Bonanza* pilot, the latter advised that he was switching back to the Kansas City Center frequency. After he had received the full summary from the Airway Weather Forecaster, the specialist at Quincy called the Center and asked the appropriate controller to advise the *Bonanza* that additional weather information was available from FSS.

However, the *Bonanza* pilot did not contact the station again. With the approval of the Center he descended to 9,000 feet, apparently seeking better visibility. At 5:31 P.M. he reported in at 9,000 but said he was still experiencing a lot of rain. He requested and received approval to descend to 7,000 feet, and was told he was being handed over to Springfield Approach Control. When he contacted Springfield Approach he told them he was at 8,200 feet and still descending. Springfield told him to report level at 7,000. The pilot, still flying in the rain, asked: "Okay, could you give me some weather advisories on my route at this time?"

The controller told the pilot that in about six or eight miles "You will be clear of all weather I show on my display." At 5:35, the pilot reported that the *Bonanza* was level at 7,000 feet. The controller acknowledged the call, and told the pilot that he showed him about three miles north of Victor 50 centerline.

There was no acknowledgement. Then the controller noticed that there was no radar return on the screen any longer for the *Bonanza*.

The controller called the aircraft but there was no answer. He then called the



Can you "wait out" the storm—or should you scrub the flight? The answer often depends on what type of storm it is: Afternoon "air mass" storm cells resulting from surface heating generally self-destruct in from 20 to 90 minutes (but others may form quickly) and are apt to diminish around dusk. "Steady state" storms associated with weather systems are usually more severe, often form squall lines, may last for hours, intensify in afternoon.

Center in Kansas to see if they were receiving a radar target on the aircraft. They were not.

The *Bonanza* had disappeared from the radar screen about 24 miles west of Springfield. Farmers in the area later reported that there were heavy rains at that time, with about one inch falling in a few minutes, amid thunder and lightning. A pilot who was flying in a radar equipped Cessna 402 at 4,000 feet some eight miles away about that time said that he was experiencing light to moderate rain and turbulence. Eighteen miles west of Springfield he said he was painting on his radar two or three storm cells about four miles ahead. When he reached a point ten miles from Springfield the cloud bases dropped to about 4,000 feet and appeared very ragged. It was then that the Cessna pilot asked for a clearance back to the VOR where he held until conditions improved.

The pilot in the Bonanza, apparently, had proceeded right on into the line of thunderstorms, become caught in turbulence, lost control, and overstressed the airplane, which broke up in flight. Both wings separated, and then the left stabilizer, both elevators, and the tail cone. The airplane plunged into a farm field about four miles east of Virginia, Ill., killing both the pilot and his wife.

Whether the pilot blundered into a thunderstorm that was obscured by stratiform clouds, or whether a storm formed rapidly around his vicinity, or whether he was caught up in peripheral storm turbulence, will never be known in this case. All that appears certain is that he lost control and overstressed the airplane. The pilot who experiences thunderstorm turbulence for the first time finds himself in a veritable nightmare. Visibility may be zero, daylight may vanish almost completely, rain or hail may batter the windshield, and the aircraft may be flung about the sky in virtually any direction, as though by the hand of an enraged giant. The "engine" that drives a thunderstorm is a whirling movement of air, starting usually as updrafts of unstable moist air which may exceed a velocity of 6,000 feet per minute. The updrafts draw other currents or gusts of air into the storm cells from various directions, and eventually culminate in vicious downdrafts.

Instrument-rated pilots are taught to maintain a level flight attitude even without the aid of the attitude indicator, since, if it is a spillable type it will cease operating correctly if its limits are exceeded (i.e., if the degree of bank or pitch exceeds a given figure, the gyros will "tumble", rendering the gyro-driven instruments unreliable). Even if the attitude indicator is of the non-spillable type, its indications may be difficult to read in extreme attitudes. Recovery should be initiated primarily by reference to airspeed indicator, altimeter, vertical speed indicator, and turn-and-slip indicator, or turn coordinator.

There is an instinctive reaction when the pilot finds himself in a severe nose-down attitude, as a result of turbulence (especially in clouds) to pull back hard on the elevator control. This reaction must be guarded against, as it could result in literally pulling off the wings, if the aircraft is in a steep diving turn. An inverted attitude, in thick IFR conditions, may sometimes be detected only by the heavy pressure of the safety belt.

Thunderstorms turbulence is by no means confined to the interior of a storm cloud. Such turbulence has been encountered in flight several thousand feet above the clouds, and as much as 20 miles laterally. Pilots who think they can safely penetrate the daylight between clouds or skirt them by a few miles are often in for a rude shock. Such was the experience of a 46-year-old pilot making a solo cross-country flight from Providence, Rhode Island to his home at St. Charles, Ill., in November of 1975.

Although not instrument-rated, he was an experienced pilot with 4,500 hours in his logbook, almost all of them in the Cessna 210 he owned and flew. Airborne shortly after 6:00 P.M., he contacted Albany, N.Y. Approach Control at 7:15 for advisories. At this time he noticed a line of thunderstorm-like clouds stretching from east to west, with observable cloud-to-cloud lightning. He advised Approach Control that he would deviate south of that storm line, allowing what he estimated as at least a five mile clearance between his aircraft and the clouds.

Near Albany he encountered a "pocket" of turbulence with such suddenness that the aircraft was flipped upside down before he could react properly at the controls. The gyros tumbled, charts and other objects scattered through the cockpit, and several hundred feet of altitude was lost before the pilot was able to right the airplane and proceed. The 210 appeared to handle with some difficulty now, and the pilot informed Albany Approach Control of the incident, and requested clearance to land at Albany. He was able to land without serious difficulty.

Once on the ground he discovered that the aircraft had indeed been structurally damaged by the turbulence experienced some five miles distant from the storm clouds. The wings had been bent upwards, the left wing had several holes in it, and the right wing had a large crease running across the surface. The right flap well was buckled, with several rivets popped. The repair bill was eventually to total over $4,000. But he was still a lucky pilot; he had survived.

By keeping well away from any suspected thunderstorm cloud a pilot can avoid the frightful experience of being tossed about by its violent turbulence. Attempting to slip under such clouds, or above them, or through apparent openings between a line of clouds is always dangerous because of the fact that the turbulence can reach out well beyond the cloud edge. Many experienced pilots are not comfortable with anything less than 20 miles horizontal distance between their aircraft and the edge of a thunderstorm.

If, despite your best precautions, you do find yourself caught in this type of turbulence, the consensus of experienced pilots is to concentrate on "attitude" flying. Given the chaotic movements of air currents in thunderstorm turbulence, where rapid updrafts and downdrafts are in close proximity, altitude or directional control may be impossible. Airspeed should be slowed to maneuvering speed to minimize possible overstress on the aircraft, but when turbulence strikes it is futile to try to maintain a precise airspeed. The pilot's main concern is to keep the aircraft as nearly straight and level as possible, and to avoid abrupt pressure on the controls.

And to remove himself from the vicinity of the storm as quickly as possible. ■

Service Logs

Who is responsible for the paperwork of aircraft maintenance?

The paperwork involved in keeping up a good and thorough set of aircraft records can be an unappealing chore, but it is one which can ultimately save you time, money, and perhaps even your life. Furthermore, it is a task which you cannot always delegate to others. The businessman who is used to having a secretary to write his letters, an accountant to do his bookkeeping, and a mechanic to maintain his aircraft, may assume that the latter will also be responsible for maintenance record keeping. But this is sometimes a false assumption, which could cost him.

Consider what happened on these occasions when a pilot/owner failed to manage his aircraft records properly:

• An Airworthiness Directive was issued for a Mooney 21 requiring the replacement of the connecting rods and assembly pins. It was an expensive repair, since the engine had to be extensively disassembled to get at the connecting rods but it had to be done. The owner paid his bill, something over $400, and flew off in his airplane, eager to be gone. It happened that he had relocated to a different part of the country when the time for his next annual inspection came due, almost a year later. The mechanic who was to perform the inspection reviewed the list of applicable A.D.'s for that particular airplane, but could find no record of compliance with the A.D. concerning connecting rods. The pilot insisted the work had been done, he even had his cancelled check, but the original mechanic could not be located, *and there was no written record of the compliance*. The airplane was not legally airworthy. The engine had to be disassembled again to make sure the connecting rods had been inserted. And the chagrined pilot had to foot the bill twice for virtually the same job—all because he did not take time to confirm that he had a written description of the work as performed, signed by the mechanic (the latter was also at fault for failing to record the work).

• A construction company acquired a small helicopter, to move men and materials quickly to work sites in rough country. The new owner did not trouble to check the papers for a description of life-limited parts —parts which must be replaced after a specified number of hours in service. At the next inspection a mechanic discovered that there was no listing of time in service for the tail rotor, an expensive item (over $1,000) which had a life limit of 600 hours on this model. Despite the fact that the rotor looked nearly new, it had to be replaced before the inspection could be completed. For lack of a proper record, much time and money was lost.

• A busy pilot called his mechanic on the phone and asked him to check out his airplane for him—there was an inspection on his cabin heater coming due because of an A.D.; the brakes seemed a bit spongy; and he thought he heard a little vibration in the elevator cable. The mechanic complied with the A.D. inspection and tightened up the brakes, but he either forgot or did not understand the pilot's instructions about the inspection of the elevator cable. However, he did enter the work he actually performed in the aircraft records, signed it, and approved it for return to service.

He then called the pilot at his office (who was in conference at the time) and left word with his secretary that the airplane was ready and that the completed records were in their usual piace in the pouch behind the right hand seat. The following weekend the pilot went out to the airport to fly his airplane. He did not bother to check the service records, but assumed that all three problems had been dealt with by the mechanic. Had he read the records before the flight he would have learned that there was no inspection or work done on the elevator. Shortly after becoming airborne he noticed the buzzing sound he had heard in earlier flights—the elevator cable was in fact severely frayed, and a few minutes later it separated completely. Without elevator control, the aircraft crash landed in a clump of trees, resulting in severe injuries to the pilot and substantial damage to the airplane.

To add to his misery, he learned later, while still in his hospital bed, that his insurance company declined to honor his hull insurance, on the grounds that he had failed to ascertain that the aircraft was legally airworthy. Many insurance companies now have a clause in their policies which state that the policy is valid only as long as the

aircraft is maintained in accordance with the applicable Federal Aviation Regulations. The FARs, essentially sections of Parts 91 and 43, contain specifics for the kind of aircraft records which must be kept, and how and by whom they must be maintained. In many accidents where these regulations about record keeping have not been followed, the insurance company has been successfully able to avoid any remuneration.

Who is responsible for the aircraft records?

Actually the responsibility is shared. Whenever a mechanic performs maintenance or alterations on an aircraft, he is required to furnish the owner or operator with a brief written description of what was done. His signature, together with his FAA certificate number, indicates that the aircraft is approved for return to service (FAR 43.7). But the *owner* or *operator* is responsible (FAR 91.163) for making certain that a proper record of such service is maintained. The phrase "owner or operator" here is understood to mean the party contractually responsible for maintaining the aircraft at a given time—where an aircraft is leased, for example, the person leasing it could be the *operator* and have the responsibility, rather than the owner. Therefore, even though a mechanic may be in violation for failing to make a proper entry, the owner or operator of the aircraft can also be in violation if the aircraft records are not in order.

This regulation makes good sense when you consider the fact that the owner or operator might have a number of different mechanics work on his aircraft in the course of time, or he might fly it from place to place, having maintenance done in different areas. To make sure of continuous record keeping, the record should be available when needed in connection with any servicing problems.

On some occasions the pilot may be neither the owner nor the operator, but he nevertheless has responsibility for the airworthiness of the aircraft. Part 91.29 of the regulations states that *"No person may operate a civil aircraft unless it is in an airworthy condition. The pilot-in-command . . . is responsible for determining whether that aircraft is in condition for safe flight."* This does not mean that he must read the service record before each flight, but it does mean that he should know the status of inspections and recent maintenance. If a pilot is aware that the aircraft experienced an unusually hard landing on the last flight, or that an A.D. requiring immediate compliance has been issued by FAA, he should confirm before flying the aircraft that appropriate maintenance, or inspection, has been performed.

Furthermore, FAR 43.5 speaks directly to the owner, operator and pilot when it states that, *"No person may return to service any aircraft, airframe, aircraft engine, propeller or appliance that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under Part 43.7, and the required maintenance record entry has been made."*

This means that even if the airplane only went into the shop for an oil change, it may not be legally flown until the mechanic has approved it for return to service in *writing*.

What records do you have to keep?

There are two types of records which the regulations oblige you to keep for the three major components of the aircraft—the airframe, each engine, and each propeller or rotor.

I. TEMPORARY RECORDS.

A. A record of all minor maintenance and minor alterations performed on the aircraft by mechanics.

B. A record of the required inspections performed on the aircraft; whether it be the 100 hour, or the annual, or a progressive inspection, or any other required or approved inspection.

These records are required by FAR 91.173, revised in 1972. Minor maintenance and alterations records may be discarded when the work has been repeated, or superceded by other work, or in any case, one year after the work has been performed. The record of routine inspections may also be discarded when the next inspection is completed. (Many owners choose to retain *all* their aircraft records indefinitely, for the sake of a more complete record, which is good practice.)

II. PERMANENT RECORDS

A. Total time in service of the airframe.

B. The current status of the life limited parts of each airframe, engine, propeller, rotor, and appliance.

C. The time since the last overhaul of items on the aircraft which are required to be overhauled on a scheduled time basis.

D. The current inspection status of the aircraft.

E. The current status of applicable Airworthiness Directives and the methods of compliance.

F. A list of the current major alterations to each airframe, engine, propeller, and rotor.

G. Current operating limitations, including revisions to the aircraft weight and center of gravity, caused by the installation or removal of equipment or alterations. (FAR 91.31 and 43.5).

What kind of format is required?

The regulations do not specify any particular format for your aircraft records. An owner may develop his own system, as long as it includes all the necessary data. He may use a separately bound log, for example, for the airframe, another for the engines, a third for propeller or rotors. Or he may keep his service records consecutively in a loose leaf book. Obviously, the more clearly and systematically this information is recorded, the easier it will be to consult.

How are entries made in those records?

Part 43 describes two main types of entries in aircraft records: those for regular maintenance, alterations and repairs; and those for inspections.

1. The first type of entry is for any work by a mechanic which involves maintaining or rebuilding or altering either an aircraft, an airframe, an engine, a propeller, or appliance. The entry must include these items: (FAR 43.9)

- A description of the work (or reference to some data acceptable to FAA.)
- The date the work was completed.
- The mechanic's name.
- If approved for return to service, the signature and certificate number of the mechanic approving it.

2. The second type of entry is made when a mechanic approves or disapproves an aircraft for return of service after an annual, 100 hour, or progressive inspection. This entry must include: (FAR 43.11)

- The type of inspection.
- The date of the inspection.
- The aircraft time in service.
- The signature and certificate number of the mechanic approving or disapproving for return to service.

The inspection entry for the so called "Subpart D Airplanes"—all general aviation aircraft over 12,500 pounds, also all turbo jets and turbine powered multi-engine aircraft—must contain a little different information. These airplanes may be on any one of several inspection programs selected by the owner, and the entry must include, *in addition to the above information:*

- The kind of inspection performed.
- A statement by the mechanic that the inspection was performed in accordance with the procedures for the kind of inspection selected by the owner.
- A statement that a signed and dated list of any defects found during the inspection was given to the owner.

(Part 2 of this article, to be published in the October issue, will include such topics of record keeping as: major repairs and alterations, preventive maintenance, replacing lost records, etc.)

Double trouble for the owner: Insurance investigators have a sharp eye out for pre-accident non-airworthy conditions that were not entered in the log as corrected.

On a bright afternoon early in November 1974 a group of sailplanes were soaring gracefully in the sky over Frederick, Md., about 40 miles northwest of Washington, D.C. The gliders belonged to a local club based at Frederick Municipal Airport, and about a dozen members were at the ground site, admiring the engineless maneuvers overhead. There was just enough warmth rising from the earth to sustain the sailplanes at an altitude of 3,000 feet.

The attention of the onlookers focused on one particular glider, a beautifully designed fiberglas *Libelle*, as it began what appeared to be a rather high-speed, nose-low descent. Within a few seconds the nose was seen to pitch up and down severely several times and then suddenly there was a sickening crackle in the air as the right wing seemed to almost explode away from the glider. The crippled plane spiraled to earth out of control and crashed in a pasture a mile south of the airport. The sole occupant, a young school teacher, was killed instantly.

The unhappy consequence of what had begun as an exhilarating experience and a beautiful flight has raised the question: *What are the special characteristics of a high performance sailplane, and how does its flight behavior differ from trainers or utility types?* Since almost all high performance sailplanes are single seaters, many glider pilots transition from trainers, which are relatively stable, forgiving aircraft, to high performance sailplanes without the benefit of dual experience in the latter. The pilot who is not prepared for the imperceptible acceleration and extreme sensivity of high per-formance sailplanes may react in such a manner as to exceed the designed stress loads of the aircraft, resulting in an inflight structural failure.

There is no official or precise classification of a glider, or sailplane, as being *high performance*, although the L/D (lift over drag) ratio is sometimes used as a criterion. In an engineless craft this ratio is equivalent to the gliding ability of the aircraft: i.e., a 30:1 L/D ratio means that the craft will glide forward 30 feet (without benefit of thermals) for each foot of altitude lost. Most high performance sailplanes have an L/D ratio in excess of 33/1, although there are other design factors which have to be considered.

In contrast to trainers and other utility type sailplanes, the typical high performance sailplane is exceptionally clean aerodynamically. The wings are long and narrow, the gear retractable, and there may be camber-changing flaps, as well as spoilers. The result is an aircraft which is extremely responsive to controls but—which also has a fairly abrupt stall characteristic. When this type of glider is circling in a thermal the likelihood of turbulence causing a wing to drop

The noiseless *Dragonfly*

Wingwalker stabilizes super streamlined sailplane on takeoff during cross-country competition.

Photo by Alex Aldott

down and a spin to begin, unless promptly and correctly countered, is always there.

But clean design has another kind of effect on flight performance which may be a more serious factor in accidents involving overstressing the airframe. With minimal drag, the sailplane will accelerate very rapidly and with little or no sensory indication to the pilot—no sound, no vibration, no warning whatever except the indications of the airspeed indicator. Unless the pilot has a habit of monitoring that instrument he may easily accelerate to a high airspeed within a few seconds after the nose has dropped a very few degrees below the horizon.

Since there is no power to reduce, excessive airspeed must be reduced by use of elevator control, spoilers or flaps—within the operating limitations applicable, and this must be done in a manner that avoids overstress. If the sailplane encounters turbulence during a highspeed dive, smooth application of back-pressure can be very difficult. The "feel" of the control may be very different from what the pilot is used to, if he has not flown high performance gliders before, or for that matter if he has not had any previous experience in this particular model.

The tragic accident at Frederick focuses attention on the potential problems. The young woman pilot who was flying the *Libelle* for the first time had logged a total of 93 hours, including 20 hours of dual time, and held a private pilot's certificate with a glider rating. She had joined a glider club to get her rating, and was considered a competent pilot by fellow members. Her logbook showed that in addition to flying a standard trainer sailplane, she had nearly two hours in an *Edelweiss*, a plywood "sandwich" glider, which is considered fairly high performance and 19 minutes in an Austrian SH-1, also a high performance sailplane.

The *Libelle* in which the fatal flight took place is one of the more popular high performance sailplanes, with a sleek fiberglas construction that results in a 39:1 L/D and excellent soaring characteristics.

The *Libelle* ("Dragonfly") is a German design widely admired by soaring enthusiasts in this country. The fiberglas reinforced plastic construction produces such exact contours that wind sound is virtually inaudible to the pilot. The glider has a wingspan of 49.2 feet, and a fuselage of 20.3 feet, with a large sliding canopy. It is equipped with flaps and retractable landing gear. The stall speed is 36 mph, the rough air speed maximum is 99 mph, and the never exceed speed is 155 mph. The minimum sink rate is 1.67 fps at 45 mph.

On the day of the accident the pilot was briefed on the ground by the two club members who owned the *Libelle*, prior to the launch, which was accomplished by aerial tow. The launch was described by witnesses as "adequately" controlled. The glider remained aloft for 50 minutes, apparently riding on a thermal in the area that was capped by a small cumulous cloud at about 4,000 feet. The pilot was then contacted by radio and asked to return to the airport, as someone else wished to fly the sailplane. It was suggested that in descending she try the performance of the glider with negative (trailing edge up) flaps at higher speed. The *Libelle* was at about 3,000 feet at this point, and this was the last communication with the pilot.

The club members watching from the ground saw the craft descending in what soon appeared to be a nose-low angle, at a high rate of speed. (Estimates of the airspeed ranged up to 150 mph.) The glider began to oscillate vertically, or "porpoise," and as the club members watched in horror the right wing broke away at an altitude of approximately 2,000 feet. There was an agonized wait of a few seconds before the glider struck the ground, but the pilot did not use her parachute. She received fatal injuries.

Another glider pilot, an instructor who was flying with a student in the area just prior to the accident, reported finding thermals, or updrafts, in the range of 200 to 300 fpm. On two occasions he observed the *Libelle* flying above him, in what appeared to be a normal manner.

The NTSB investigation, which discovered

After the accident the *Libelle* lies crushed and wingless in the Maryland countryside.

A prerequisite to checking out in high performance gliders is thorough familiarity and instruction in the basic principles of soaring, and plenty of time in trainers. Every glider design has different flight characteristics, which should be explained by a knowledgeable pilot before flight.

no structural weaknesses in the aircraft, ascribed the probable cause of the accident to lack of familiarity with the aircraft, involving flight that exceeded the designed stress limits of the aircraft. Some unofficial observers theorized that the *Libelle* had encountered thermal turbulence while descending well in excess of the rough air speed limitation. Others have speculated that the bumpy air of the updrafts caused pilot-induced oscillation due to her unfamiliarity with the extreme sensitivity of the elevator control and the wing flexing caused by turbulence. A slightly lowered pitch angle is all that is required to produce an accelerated descent in the *Libelle*, and if the craft encountered additional turbulence at near redline speed, overstress could certainly have taken place.

The question as to why the pilot did not use her parachute remains a mystery. The wing broke off at the point where the spar enters the fuselage, with a very loud noise and a showering of fragments, which conceivably could have incapacitated the pilot through shock or injury.

Lack of pilot familiarity with a high performance glider, leading to inflight structural failure, has not been a prominent cause in fatal glider accidents in previous years. A review of NTSB accident records covering the period 1964-1973 discloses only four cases in which a pilot with less than 26 hours in type exceeded the design stress limits of what were generally considered to be high performance sailplanes. Two of these accidents were attributed to impairment of pilots' judgment by hypoxia; in a third accident impairment of judgment by alcohol was noted; and the fourth case involved structural failure due to lack of adequate adhesive bonding. No such structural failure fatal accidents in high performance gliders have been reported since the Frederick accident in 1974.

Nevertheless, pilot error continues to be a predominate factor or cause of soaring accidents in general. NTSB figures for the period 1970 through 1974 show pilot error to be the cause of 76 percent of fatal glider accidents, and 87 percent of all glider accidents. The most prevalent pilot errors in the fatal accidents are failure to obtain or maintain flying speed, improper operation of flight controls; and exceeding the design limitations of the aircraft.

In October of 1975 a Schempp-Hirth SHI sailplane spun out of control and crashed on Mt. Helena near Calistoga, Calif. The pilot, who died in the crash, was a Coast Guard helicopter pilot with a total of 1,388 hours. However, only 43 hours were in gliders, and only 12 in the high performance SHI. One of his glider logbook entries notes ". . . rusty after two months of not flying."

Pilots who intend to transition to more advanced or high performance or competitive models are advised to maintain currency and to log as much time as possible in a variety of trainers or utility types beforehand. It is also important to accustom yourself to monitoring instruments to insure safe flying speeds and attitudes. Relying on sensory perceptions can be altogether unreliable in an aircraft designed for minimal weight and wind resistance. The joys of soaring are great, but the penalty for inattention can be severe. ■

FARs

STATUS of the FEDERAL AVIATION REGULATIONS

(As of September 1, 1976)

The Federal Aviation Regulations, formerly published only in volumes, have been re-issued as individual Parts. Infrequently amended Parts are sold as single-sale items, while frequently amended Parts are sold on subscription. Subscribers to volumes were notified of prices and ordering procedures for the new Parts by the Superintendent of Documents as their volume subscriptions expired.

The number in parentheses after each Part indicates the latest change, if any, to that Part, which is sent out gratis to the subscriber. Changes to single-sale items are sold separately. FARs may be purchased only from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

FAA SEPARATE PARTS	TITLE	PRICE
Parts sold by subscription		+ foreign mailing
Part 1	Definitions and Abbreviations (2)	$3.00 + 75c
Part 21	Certification Procedures for Products and Part (4)	$3.75 + 95c
Part 23	Airworthiness Standards: Normal, Utility and Acrobatic Category, Airplanes (2)	$3.55 + 90c
Part 25	Airworthiness Standards: Transport Category Airplanes (2)	$6.60 + $1.65
Part 33	Airworthiness Standards: Aircraft Engines (1)	$3.00 + 75c
Part 36	Noise Standards Aircraft Type and Airworthiness Certification (3)	$3.00 + 75c
Part 37	Technical Standard Order Authorizations (3)	$5.65 + $1.45
Part 63	Certification: Flight Crewmembers Other Than Pilots (1)	$3.00 + 75c
Part 91	General Operating and Flight Rules (10)	$11.30 + $2.85
Part 93	Special Air Traffic Rules and Airport Traffic Patterns (5)	$2.45 + 65c
Part 103	Transportation of Dangerous Articles and Magnetized Materials (8) NOTE: Part 103 will be revoked July 1, 1976.	$2.20 + 55c $9.20 + $2.30
Part 121	Certification and Operation: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft (15)	
Part 123	Certification and Operations: Air Travel Clubs Using Large Airplanes (1)	$2.00 + 50c
Part 139	Certification and Operations: Land Airports Serving CAB Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters (2)	$3.00 + 75c
Parts sold as single copies (foreign mailing add 25% of total price)		
Part 11	General Rule-making Procedures	$0.55
	Change 1	$0.45
	Change 2	$0.35
Part 13	Enforcement Procedures	$0.70
Part 27	Airworthiness Standards: Normal Category Rotocraft	$1.40
	Change 1	$0.75
	Change 2	$0.40
Part 29	Airworthiness Standards: Transport Category Rotocraft	$1.70
	Change 1	$0.70
	Change 2	$0.35
Part 31	Airworthiness Standards: Manned Free Balloons	$0.40
Part 35	Airworthiness Standards: Propellers	$0.35
**Part 39	Airworthiness Directives	$0.35
Part 43	Maintenance, Prevention Maintenance, Rebuilding and Alteration	$1.80
Part 45	Identification and Registration Marking	$0.65
Part 47	Aircraft Registration	$0.85
Part 49	Recording of Aircraft Titles and Security Documents	$0.45
Part 61	Certification: Pilots and Flight Instructors	$2.90
Part 65	Certification Airmen Other Than Flight Crewmembers	$1.25
Part 67	Medical Standards and Certification	$0.50
*Part 71	Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting	$0.85
	Change 1	$0.30
*Part 73	Special Use Airspace	$0.40
	Change 1	$0.30
*Part 75	Establishment of Jet Routes and Area High Routes	$0.40
	Change 1	$0.40
Part 77	Objects Affecting Navigable Airspace	$1.10
**Part 95	IFR Altitudes	$0.50
	Change 1	$0.35
**Part 97	Standard Instrument Approach Procedures	$0.45
Part 99	Security Control of Air Traffic	$0.70
	Change 1	$0.40
Part 101	Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons	$0.65
	Change 1	$0.30
Part 105	Parachute Jumping	$0.55
Part 107	Airport Security	$0.40
Part 127	Certification and Operations of Scheduled Air Carriers with Helicopters	$1.80
	Change 1	$0.35
Part 129	Operations of Foreign Air Carriers	$0.45
	Change 1	$0.35
	Change 2	$0.40
Part 133	Rotocraft External Load Operations	$0.55
Part 135	Air Taxi Operators and Commercial Operators of Small Aircraft	$2.50
	Change 1	$0.35
	Change 2	$0.35
Part 137	Agricultural Aircraft Operations	$0.50
	Change 1	$0.35
Part 141	Pilot Schools	$1.15
Part 143	Ground Instructors	$0.45
Part 145	Repair Stations	$0.75
Part 147	Aviation Maintenance Technician Schools	$0.65
Part 149	Parachute Lofts	$0.35
Part 151	Federal Aid to Airports	$1.55
Part 152	Airport Aid Programs	$1.35
Part 153	Acquisition of U.S. Land for Public Airports	$0.50
Part 154	Acquisition of U.S. Land for Public Airports Under the Airport and Airway Development Act of 1970.	$0.40
Part 155	Release of Airport Property from Surplus Property Disposal Restrictions	$0.40
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports	$0.40
Part 159	National Capital Airports	$1.00
	Change 1	$0.35
Part 169	Expenditure of Federal Funds for Non-Military Airports or Air Navigation Facilities Thereon	$0.35
Part 171	Non-Federal Navigation Facilities	$1.10
	Change 1	$0.65
Part 183	Representatives of the Administrator	$0.45
Part 185	Testimony by Employees and Production of Records in Legal Proceedings and Service of Legal Process and Pleadings	$0.30
Part 187	Fees	$0.40
Part 189	Use of Federal Aviation Administration Communications System	$0.40

Prices shown are those in effect as of September 1, 1976, and are subject to change without notice.

* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, en route IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95, and 97. In addition, en route IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (AGC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D.C. and at FAA regional offices and Flight Inspection District Offices.

Famous
Flights

From Kitty Hawk to the Moon... In One Magical Building

New National Air and Space Museum

In the history of aviation, flights of fantasy also have their place. One such flight, which was completed on the 200th birthday of the nation, is likely to interest more persons than any other single episode in the annals of aeronautics. It involves not one celebrated aircraft or pilot, but many; not one particular date or duration of time but all of time and space itself. This fantastic concept of man in motion above the earth is the new National Air and Space Museum. It is the new showplace of America and may well prove to be the most successful and popular exhibit ever. But in any case it is unquestionably the new Mecca of aviation enthusiasts, none of whose lives will ever be complete without a visit to this glass and pink marble edifice on the Mall of the nation's capital.

The main entrance to the building, from the Capitol Mall, leads into the gallery known as the "Milestones of Flight," a glass-domed enormous hall, 115 by 124 feet with a 62 foot ceiling, containing the nine epoch-making aircraft of the age of flight. First and foremost, suspended in apparent flight, is the immortal Wright 1903 *Flyer*, with a realistic figure of Orville Wright lying prone on the wing next to the bulky 12 hp engine. This first of all powered aircraft ever to lift a man from the earth is startling in its simplicity, or even crudity, of construction; the wooden shafts, runners and elevator control, the heavy bicycle chain driving the enormous but rudimentary propellers, the twin-everything—wings, elevators, rudders—and the absolute maze of wire that held it all together. Seen from below it appears to be more akin to a well-made Eskimo dogsled than a creature of the air.

In sharp contrast to the prone Orville on the 1903 *Flyer* (with his black tie, formal jacket, and high button shoes) is the image of the astronaut Edward H. White, seen emerging from the spaceship Gemini IV to become the first American to walk in space. Clad in his silvery spacesuit with the bright gold "umbilical cord" that supplied his vital needs, he propelled himself forward with the aid of a compressed air thruster, 175 miles above the earth. White seems incredibly removed from that first humble effort at Kitty Hawk 60 years earlier. Consider that the engines used to propel him skyward delivered a million pounds of thrust!

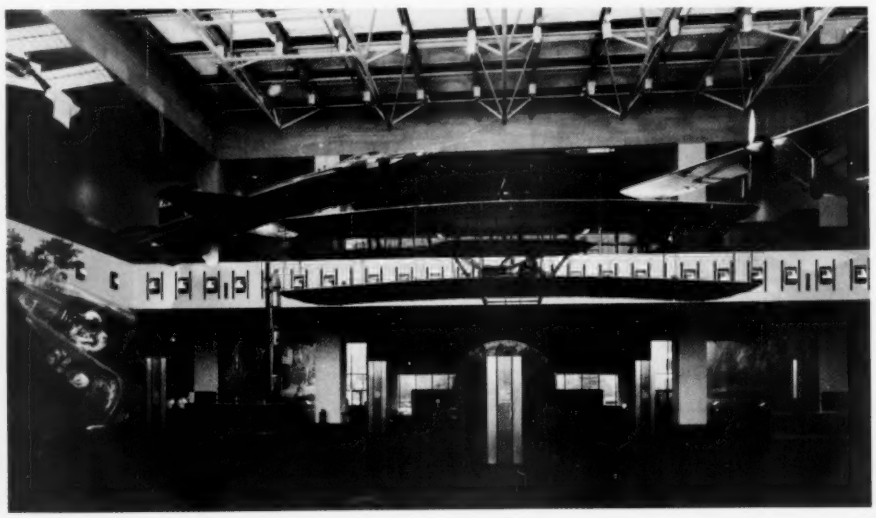
Nearby in the hall is the smaller spaceship *Friendship 7*, in which John Glenn first orbited the earth in 1962, crammed into a tiny cockpit surrounded with miles of plumbing and wires and hundreds of switches.

Also positioned beneath the *Flyer* is the spaceship *Columbia*, which carried astronauts Neil Armstrong, Edwin Aldrin, and Michael Co'lins to the moon in 1969. The cone-shaped wingless space capsules bear no physical resemblance whatever to the original airplane; it is difficult to believe that the first hesitant hop over the sands of Kitty-hawk culminated in a boundless leap into space.

Above *Gemini IV* floats the flimsy Langley *Aerodrome No. 5*, the first successful engine-driven heavier-than-air (unmanned) craft. Launched from a houseboat in the Potomac River in Washington, D.C. in 1896, the *Aerodrome* achieved a flight of 3,300 feet, propelled by a steam engine. A neighboring display is a replica of the slender *Mariner 2*, the unmanned space vessel that explored the p'anet Venus in 1962 on a 36 million mile flight that culminated in a still ongoing orbit around the sun.

Hanging from the "sky" in another corner of the hall is the bullet-shaped orange and white *Bell X-1*, which in 1947 was the first piloted aircraft to exceed the speed of sound. The *X-1* was released from the belly of a B-29 on that historic day, when test pilot

Entering the main lobby, the visitor finds himself dwarfed by the dimensions of a great hall that encompasses seven decades of aviation history, starting with the Wright *Flyer*.



Charles Yeager flew it at 700 mph, and laid to rest forever the myth of an invincible "sound barrier."

In still another corner of the hall the *Spirit of St. Louis* spreads the silvery wings that carried Charles Lindbergh across the Atlantic to Paris and immortal fame in 1927. The mystery of how Lindy was able to navigate an aircraft with no forward visibility (the cockpit ahead of him was literally walled in with fuel tanks), let alone land or take off safely, is only deepened by the 360 degree view of the plane afforded here. Perhaps if he had seen the stormy skies ahead of him over the ocean on that fateful night he might have lost heart and turned back.

Finally there is North American's *X-15*, the rocket powered research airplane that became a spacecraft when it penetrated the edge of space with a flight altitude of 67 miles above the earth. Launched from a special pod under the wing of a B-52, the *X-15* flew well over six times the speed of sound (Mach 6.72). The lower half of its vertical stabilizer had to be jettisoned prior to landing.

The "Milestones of Flight" is only a foretaste of what is to be seen: some 10 acres of exhibits including 64 aircraft and 100 space vehicles. Each of the manned aircraft on display is the actual historic craft—not a model or replica. The spacecraft are either the original craft or a backup of it—or in a few cases, a replica built of actual spacecraft parts. One of the most popular exhibits is the orbiting Skylab.

Virtually every famous American aircraft —and a number of foreign planes, including the *Spitfire* and *Hurricane*, World War II classics—is here to be seen and admired, with special touches of showmanship added. Roscoe Turner's *Meteor* is guarded by his faithful lion, "Gilmore" (stuffed, of course). Wiley Post is suited up in his early version of a spacesuit beside his faithful *Winnie Mae*. Each gallery seems more remarkable than the last, and no one who cares anything about aviation could be satisfied with one visit. The new National Air and Space Museum is a living history of a marvelous dream come true.

And it's free! ■

From the second floor balcony the visitor is at eye level to the *Spirit of St. Louis*.

BRIEFS

WHAT THE PILOT CAN DO. new advisory circular "Preventive Maintenance" discusses the items of maintenance that a pilot may perform (under FAR Part 43 Appendix A) on his own aircraft, and the various regulations that apply to him and this work. Some 25 items on an aircraft are considered "preventive maintenance" and thus are permitted to be done by the pilot. AC 43-12 is available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

■ OVER THE TOP. Pilots who are planning a flight over mountainous country should make it a point to see the new FAA movie, "Mountain Flying," a beautifully photographed message to general aviation pilots on the precautions and techniques for flying over rugged highlands. Filmed in the Rockies, the 23 minute movie received the 1976 Award of Merit from the National Committee on Films for Safety. To arrange a showing of "Mountain Flying," contact your FAA Accident Prevention Specialist, or borrow a copy from the FAA Film Library, AAC-44E, 6400 S. MacArthur Blvd., P.O. Box 25082, Oklahoma City, OK 73125.

NDT FOR AIRPORTS. A new FAA booklet provides technical guidance on the use of nondestructive testing (NDT) in the evaluation of airport pavements. The booklet discusses equipment and test procedures, frequency, number and location of test sites, rigid and flexible pavements, climate considerations and analysis of test results. For free copies of "Use of Nondestructive Testing Devices in the Evaluation of Airport Pavements" (AC 150/5370-11) write DOT/FAA Publications Section, TAD 433.1, Washington, D.C. 20590.

TRANSPONDER CHECKS. Aircraft owners are reminded that all transponders presently in use must be checked every 24 months. If a transponder is used it must meet specific standards, and must be checked every two years (FAR 91.177). These tests must be accomplished (and signed off) by a properly rated mechanic. IMPORTANT: This required, signed transponder check is not to be confused with the mobile checks of the transponder/radar system in which pilots are being asked to participate at some air shows or fly-ins. The latter tests, which are voluntary for the pilot-owner, are conducted from a mobile van parked on the airport, and are done while the airplane is taxiing, without test personnel entering the aircraft. The purpose of such mobile tests is to evaluate the effectiveness of the radar beacon in the ATC system; this mobile check does not meet the requirement of 91.177.

SUN, AIR AND RUBBER. Two of the most destructive elements in the life of an aircraft tire are the rays of the sun and under-inflation. Most aircraft inner tubes and tubeless tire liners are made of natural rubber which satisfies low-temperature needs, but does not retain air as well as butyl rubber, which is used in automobile tires. For this reason aircraft tires should be checked often and kept at the specified pressure. Low pressure is a direct cause of premature tire wear.

As for sunlight, you can minimize the harmful effects of the sun by parking so that tires are in the shade if you have a choice. If your airplane has wheel fairings, leave them off only when really necessary. In any case, a frequent inspection of tires for sun damage (cracks, checking and hardening) is advised.

HAPPY ENDING. Alaska bush pilot Bud Woods coaxed his Hiller Turbine Conversion almost to the top of Mt. McKinley in Alaska, America's highest mountain, to rescue two badly injured mountain climbers, and set a record for the highest elevation landing ever in North America. The injured climbers, Jennifer Williams, 23, of Portland, Oregon and Paula Kregel, 28, of Seattle had been stranded near the top of the 20,320 foot mountain for more than two days after falling during a climbing expedition. Woods hovered his craft in for a "landing" with one skid on a snow-covered shelf, the other a thousand feet above solid ground, and the blade tips barely clearing the hillside.

Air Taxi/Commercial Rules to Be Reviewed, Revised

FAA has invited the aviation community to attend a regulatory review conference that will formulate proposed rule changes for Part 135 of the Federal Aviation Regulations, that govern Air Taxi/Commercial Operations. All Air Taxi/Commercial Operators are being mailed invitations to attend the review, and each will receive a copy of the proposals under consideration before the conference, which will be held from November 8-12, 1976 at Stouffer's Denver Inn. All other interested persons are welcome to attend. Registration will be handled at the conference, beginning November 7. There is no fee.

Rule changes discussed at the conference are expected to bring certain safety standards of Air Taxi/Commercial Operations closer to the standards imposed on air carriers operating under FAR Part 121. Affected are air taxi, commercial and commuter operations which carry passengers, mail or property for hire, either on a regularly scheduled basis or on demand.

Over the past decade Air Taxi/Commercial Operations have grown rapidly, both in numbers and size as well as in the sophistication of equipment. The 1975 fleet included 204 turbojets, 493 turboprops, 1113 rotorcraft, and 3537 multi-engine piston-driven aircraft, in addition to 3875 single engine piston-driven aircraft. There are over 3,800 holders of Air Taxi/Commercial Operator Certificates.

FAA anticipates that this innovative type of industry review, which puts public participation before the fact of rule-making proposals rather than after, will result in greater cooperation from the user.

Transmitters Must Be FCC-approved

An FCC rule requires all aircraft transmitters which were type certificated after January 1, 1974, to have a frequency stability of .003 percent. However, transmitters having a frequency stability of .005 percent (which was the previously allowable tolerance) are still legal if they appear on FCC's "List of equipment acceptable for licensing in the aviation service." If you have a doubt as to whether your transmitter is legal, check with your nearest FCC field office or write FCC headquarters at Box 1030, Gettysburg, Pa. 17325.

Proposal to Aid Aircraft Identity

Removing or altering identification plates on aircraft, engines or propellers would be specifically prohibited under a new rule proposed by FAA. The agency is concerned that ID plates, which contain the builder's name, serial number and other information, may be altered or switched by persons making a deliberate attempt to obtain airworthiness certificates without meeting applicable requirements. Rules require that an aircraft must be shown to conform to its type design before FAA will issue an original airworthiness certificate, and subsequent repairs and modification must be compatible with that type design.

There is evidence that some ID plates have been removed from wrecked or worn-out aircraft and installed on "look-alike" military surplus aircraft or on those built from spare or surplus parts. The person making the switch then applies for a duplicate copy of the original airworthiness certificate for the aircraft from which the ID was taken, claiming the original was lost or destroyed. The new rule is designed to eliminate this practice.

Comments on the proposal should be submitted in duplicate to FAA, AGC-24, Washington, D.C. 20591. Deadline is November 8, 1976.

Speedier FSS Equipment on Order

New high-speed data terminal equipment that has been ordered by FAA for selected Flight Service Stations will provide speedier weather and flight information to pilots, with less potential for error. The new system also has recording features which will eliminate cumbersome teletypewriter paper and tape handling, thus freeing more of the FSS specialist's work time to be used in assisting pilots.

The new equipment is capable of receiving data on cathode ray tube displays at speeds up to 3,000 words per minute. Delivery of the equipment is expected to begin in about a year.

Mountaintop Monitors for Maydays

FAA is testing the use of radio receivers on five mountain peaks in the Pacific northwest to help listen for distress signals from downed aircraft. Receivers are tuned to 121.5 MHz, the emergency frequency used by emergency locator transmitters (ELTs) which activate automatically when an airplane crashes. The receivers, which will be tested throughout the coming winter, pick up the ELT signals but provides no direction finding; this is done by follow-up aircraft or ground vehicles. The receivers are located at manned FAA long-range radar sites on Laurel Mountain and Haymaker Mountain in Oregon; on Cascade Mountain and Sawtelle Peak in Idaho; and on Mica Peak near Spokane.

• An International Maneuver?

I noted in the "Pilot/Controller" Glossary in your June 1976 issue that the definition of "Acrobatic Flight" is an "international maneuver . . ." I believe it was meant to be an "intentional maneuver." International maneuvers should be left to our distinguished Secretary of State.

Edward Lyons
Amityville, N.Y.

Acrobatic flight is properly defined as an "intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight." Our thanks to you and the many others who called attention to this typographical error.

• Empty Weight

I note that Cessna has included the weight of full oil in the licensed empty weight of the 1976 *Skyhawk*. My understanding is that FAR 23.29 (a)(3) requires the empty weight to be determined with "undrainable oil." Can manufacturers pick at will what they include in empty weight?

Your magazine provides a valuable information service for pilots. I hope you keep up the good work.

Ralph E. Svetic
Cicero, Ill.

The empty weight listed with the weight and balance figures in the Pilot's Operating Handbook is not necessarily the same as the certificated empty weight of the aircraft (no measurable oil). The manufacturers are free to provide figures in the Handbook in the manner they feel will best assist the pilot in calculating the weight and balance. In your case Cessna has accomplished one of the necessary steps in computing weight and balance for you.

• A.D. Summaries

I don't understand why subscribers to the Airworthiness Directives (AD's) are now required to pay $14.00 for a complete new set. Why can't we just buy the revisions? Isn't this unnecessary expense?

Roger E. Anderson
Ogden, Utah

AD Summaries are sold on subscription, which includes an updated Summary plus biweekly revisions for two years. As revisions accumulate the Summaries are apt to become cumbersome, difficult to refer to, and error-prone. A new book every two years eliminates unnecessary bulk, brings the Summary up to date, and provides a fresh starting point for subscribers to apply revisions. Incidentally, the $14.00 subscription fee covers only a small part of the actual cost of producing and distributing this important data—in fact, it may not even cover mailing costs.

• From a Student

Thank you for the sample copy of *FAA General Aviation News*. I have now subscribed and after looking through several issues, I don't know how I could have lived without it. It is the finest publication I have seen to come from GPO. I have 14 hours toward my private license and the magazine gives me added inspiration to continue.

Patricia Moore
Chicago

• P.S. on Howard Hughes

Just finished enjoying your article about Howard Hughes and his many accomplishments in aviation. An aura of mystery and confusion still surrounds this man, and particularly his 1938 round-the-world spectacular. Although the airplane used on that flight is often called a Lockheed *Lodestar*, it actually was a *Super Electra*. The *Lodestar* (which was simply a stretched, remodeled *Super Electra*) was not developed until 1939.

Another source of confusion is the exact route mileage of the trip; you see it listed as 14,540 miles, 14,874 miles, and and everything in between. If you ask the official timekeepers, National Aeronautics Association, they can't even find the Hughes file in their archives. That's UNUSUAL! Aviation history—the men and the machines and the ideas—are, and will always be a fascinating subject.

Thomas M. Emmert
Peabody, MA

• Poor Man's VASI

I am curious about the "Poor Man's VASI" discussed in the April Forum. How does it work and how big it it?

Your publication does aviation a good service. Thanks.

Mack Sterling
La Marque, Tex.

As described by Bill Collins (engineer for Maryland DOT, who developed the system described in April), the bar-alignment VASI consists of three bright orange panels, each two feet by six feet. The two outside bars are near the runway threshold, about six feet above the ground on breakaway poles. The middle bar is positioned about 50 feet farther down the runway, generally about a foot or two off the ground. If the pilot is on the proper glide path all three bars appear to line up horizontally; if he is low, the center bar will appear low; if he is high, it appears high.

• Signing Off the Annual

A question has arisen in our Flying Club regarding the aircraft logbooks. When we have an annual inspection done, should the holder of an Inspection Authorization (IA) sign both the airframe and engine logbooks, or should he sign only the airframe book, naming all the items he has covered in the inspection? There is disagreement on this matter among our members.

Juan M. Blanco
U.S.N.S..FPO New York

If separate logs are maintained, each should be signed. Individual items need not be indicated for inspection. For more details, see "Aircraft Records," page 6-7, this issue.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Props and Stops

Your periodical does continually present very good information on safety for the aviation public, so keep up the good work. However, with the full knowledge that criticism is easy to give, especially in the nitpicking area, I would offer the following comment. Your article on "Nick-Knocked Props" (June, 1976) is opened by a picture of a light twin with the left engine operating and the passenger door, on the left immediately ahead of the propeller, open. This would seem to be an invitation to disaster for obvious reasons.

Robert F. LeSuer
Los Angeles, Calif.
FAA Western Region

Good criticism, gratefully accepted.

• Prop Watching

Having been around rotating props both on the ground and in the air, I feel a chill up and down my spine at the thought of flying prop fragments. Back many years ago when aircraft had wooden props with brass tips it's little wonder that these "missiles" didn't fly loose and create more accidents. With turbo props turning up at such high RPM's, this becomes an increasingly dangerous possibility. I suggest that an investment in a "dye check kit" could be of great help in testing the end portion of the prop and any nicks in question.

Charles F. King
Pleasant Grove, Calif.

INSTRUMENT CORNER

• Approach Without Clearance?

When you are on an instrument flight plan do you always need an approach clearance? And what do you do if no one volunteers one? Suppose your destination airport does not have a tower or FSS, your original clearance is to the destination airport, and there was no change in your clearance during the flight. How far can you go on your "cleared to destination airport" clearance?

James M. Thoburn
Rochester, N.Y.

If you are arriving on a "cruise" clearance, Air Traffic Control will not issue further clearance for approach and landing. The term "cruise" (normally used only for relatively short flights in uncongested areas) removes the altitude restriction usually contained in a clearance and authorizes you to continue to your destination without further clearance. You must, however, comply with communications and reporting procedures as on any other IFR clearance.

If you are not *on a cruise clearance, then a clearance to descend from your en route altitude will be issued at the appropriate time, as will an approach clearance. In this situation, as in all IFR flight, if you fail to receive a clearance by the time you think you should have, or if you do not understand the clearance, you should ask ATC about it. (You might have radio failure.)*

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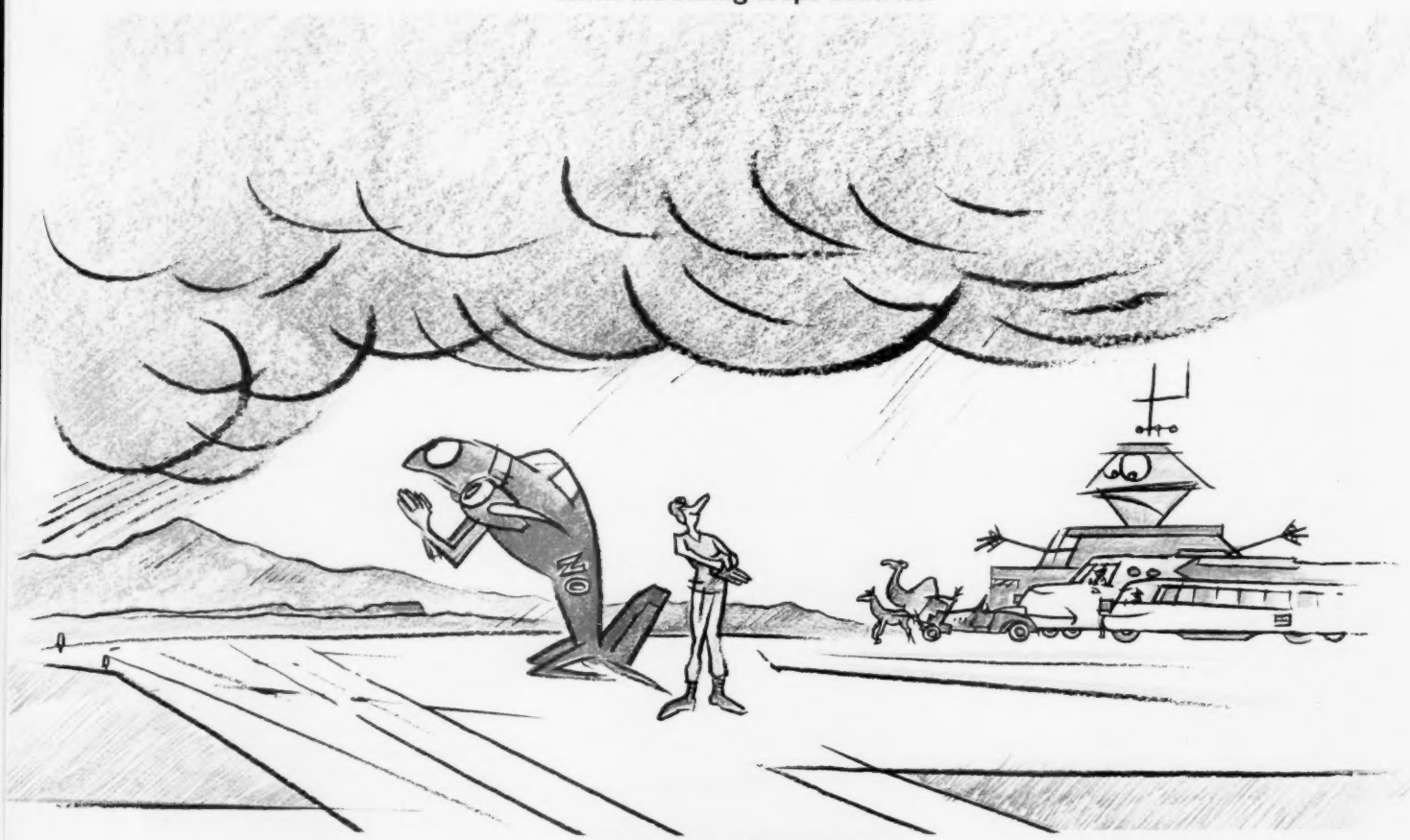
When the ceiling drops down low



Find some other way to go

Suggested by Terry Lankford,
FSS, Bakersfield, Calif.